lapped had been absorbed down to the medullary portion, on the side where they were in contact, and had thus formed two flat surfaces which had united.

I venture the opinion, that in most, and probably in all, cases of fracture of the femur, whether transverse or oblique, *with shortening*, the fractured ends of the bone cannot be placed in exact apposition by any force which can be safely applied to living tissue.

It is admitted by most modern writers on surgery, that shortening of the limb in fracture of the thigh is to be expected, and is generally found after proper treatment. Would it not be more correct to say, it is always found (when produced by a fracture), because a shortened thigh-bone *cannot* be fully extended to its normal length after the broken ends of bone have passed each other?

ART. VI.—*Cases of Stricture of the Rectum treated by Different Methods; one of them by Electrolysis.* By WM. R. WHITEHEAD, M.D., of New York, Physician for Diseases of Women at the Northwestern Dispensary.

THE unsatisfactory results which so often follow the ordinary treatment of stricture of the rectum, is a sufficient reason to call attention to the following cases. They illustrate in a comparative manner the value of certain modes of treating this disease, which is confessedly a very distressing one, and exceedingly difficult to manage. It is proper, however, to preface the relation of these cases by the statement, that I believe that the most effectual way to cure fibrous stricture of the rectum is by a thorough division of the stricture posteriorly, and by dilatation afterward by means of elastic pressure, such as I have described in a preceding number of this Journal (Jan. 1871).

CASE I.—Mrs. F., a very intelligent lady about forty-two years of age, consulted me at the suggestion of Dr. Wm. George Thomas, of Wilmington, N. C. For a number of years she experienced much distress and difficulty in relieving her bowels; but was not aware of the presence of a stricture of the rectum until examined by Dr. Thomas about twelve months previous to the time at which I first saw her. He was of the opinion that the stricture was not cancerous, and this opinion was strengthened by a microscopic inspection by Professor Leidy, of Philadelphia, of some of the dejected matters which were sent to him for examination.

On the 15th of May, 1871, after she was thoroughly etherized by Dr. F. H. Deems, I made a careful examination of the rectum and contiguous parts. There was a tight stricture of the rectum more than an inch in length, and which extended from opposite the lower part of the Douglas cul-de-sac upward, and above it. A considerable mass of indurated tissue formed the stricture anteriorly, and occupied a very extensive relation with the peritoneal covering of the rectum. Mrs. F. informed me that she had for ten or twelve years worn a pessary in the vagina, and that she had once worn this instrument about a year without removing it. She was disposed to attribute the stricture to inflammation caused by the long-continued pressure of the pessary against the rectum, and I am quite inclined to adopt this opinion. The case appeared to be a formidable one for operation, and not being at that time so well convinced of the necessity of a thorough section of the stricture as I am at present, I was undecided whether to cut or rupture it.

However, believing it necessary to resort to either one or the other of these procedures, in order to obtain subsequently a desirable degree of dilatation with the elastic pressure, which I believe to be the safest method of dilatation, and an effectual one for the treatment of most cases of stricture of the rectum, on the 18th of May, assisted by Dr. J. B. Landeta, Dr. Francis H. Deems, and my present clinical assistant, Dr. A. Landeta, I ruptured the stricture with Sims's dilator, and completed the rupture with my index finger, having directed my force principally against the posterior wall of the gut. The rupture was made without difficulty, but I was apprehensive about the extent of this rupture and the danger of laceration of the rectum. This danger I do not believe to be overrated; and since I have quite satisfied myself about the safety with which a deep incision of the rectum may be made posteriorly, I prefer incision to rupture of a stricture except when seated quite near the anus. After the operation a piece of sponge about the size of a small orange and with a string attached was readily passed up the gut beyond the previous seat of stricture, so that the part could be well seen with Sims's speculum by all present. At the time of this operation, I was unaware of the existence a short time before, of a slight subacute peri-uterine inflammation. The knowledge of this condition gave me considerable solicitude about the safety of the patient. She had some peritonitis, which was controlled however with morphia in fractional doses given at intervals. The use of the duck-bill speculum, caused a fissure of the anus, which was cured by rupture of the sphincter ani muscle with the fingers. The peritonitis interfered with the immediate after-treatment by dilatation, but after six or eight days she used very effectively the instrument which I have recommended for elastic dilatation, but which has been so modified as to be much preferable to that first used. Four, five, or six rubber condoms one over the other, and properly adjusted to the instrument, will offer as much resistance as a stout Barnes's dilator, and are much easier to introduce either by the patient or by the surgeon. The probe which is attached to the instrument, and which is inside of the rubber bags, should be made of whalebone, and should be of the requisite degree of flexibility, and covered with a piece of rubber tube about the eighth of an inch in diameter. The tube protects the whalebone from the water, which would soon soften it and make it worthless as a director. There is no difficulty about the use of this instrument in the hands of an intelligent patient when once shown how to adjust properly the condoms to the instrument, and to its directing whalebone staff. A single rubber bag sufficiently stout would appear to be much preferable; but attempts have been made by instrument-makers of this city to make such bags for me for this purpose, but there has always been some defect about them, which made them dilate very unequally, and burst at one of the seams or elsewhere. Rubber condoms or capotes can be obtained anywhere; they are used by oculists for ice-bags, and, introduced into the natural cavities of the body and distended with ice-water, are useful for stopping hemorrhage. Half a dozen condoms, properly adjusted one within the other, and distended with water by means of a Davidson's syringe attached to a tube with a stopcock, I have found to be a good way to treat vaginismus after section of the vaginal sphincter, or even when cutting of this sphincter is not required.

It is very important to wash out the rectum three or four times a day with carbolized injections. A lacerated wound or cut of the mucous membrane of the rectum, constantly bathed with excrementitial matter and with pus, becomes without this means a great source of danger from septicæmia. During the latter part of July I received from Dr. Thomas a letter from which I make the following interesting extract:—

> "The lower part of the stricture is decidedly relieved, the upper part not so completely. She has devised a modification of your capote dilator which struck me with force, and I think will answer an admirable purpose. She puts a silk bag between the rubber capotes, and ties them to the guiding staff. The silk bag may be stretched to its utmost capacity, and is firm, and is well protected from both the injected fluid and the secretions of the rectum by the condoms. It operates well, and upon trial I think you will be pleased with her ingenious improvement. She has used the dilator daily since she left New York. I advised her to use it once every three or four days only, during two to four hours at a time, and to gradually enlarge the silk bag."

The width of the silk bag, a paper model of which Dr. T. sent to me in a letter, is two and a quarter inches. In a letter from the patient dated December 16th, 1871, more than six months after the operation, she stated that she uses the dilator quite frequently, and that her physician recommended her not to use it oftener than once in two or three weeks. She stated that her appetite was excellent, and that she was able to attend actively to her household matters; she had gained flesh, and all of her friends had observed and remarked upon her improved condition. We believe that a rather frequent, but judicious and long-continued, use of the elastic dilator in such cases to be very necessary.

CASE II.—Last summer Dr. A. Worthington, of Ontario, Canada, consulted me by letter relative to Miss M., who had stricture of the rectum of a number of years' standing, and which was complicated with a recto-vaginal fistula. The parents of the lady, by advice of Dr. W., their family physician, requested me to visit her at her residence near the village of Wroxeter in Canada West, and, if necessary, to perform such an operation on the stricture as the necessities of the case might require. Miss M. was thirty-four years of age; I found her anæmic, greatly emaciated, exceedingly inanimate and taciturn in her manner. I was much discouraged by the appearance of her general condition. Menstruation had ceased about two years before she consulted me, but previously it was regular. During two or three years there were discharges of bloody water from her bowels, together with lumps which her mother said resembled fat meat. During a period of four years she had occasionally hemorrhages from her bowels; altogether nine or ten in number. During the last three years her health had gradually declined. July 12th, 1871, the day on which I first saw her, assisted by Drs. Worthington and Byron Crandell, of Clifford, she was etherized and I made a careful examination of the rectum, which revealed by the vaginal touch a very indurated cervix and a recto-vaginal fistula on a level with the posterior lip of the cervix. The fistula admitted with some constriction the end of the index finger. The uterus was normal in size, but bound down posteriorly by adhesions. The rectal touch discovered two strictures with the recto-vaginal fistula between them. The lower stricture was inconsiderable in size, and was situated immediately above the sphincter ani muscle. The upper and principal stricture was seated three inches higher up the gut. The walls of the rectum between the strictures were firm, rigid, and posteriorly were slightly *nodulated* and suggestive of an interstitial, malignant deposit. The upper stricture admitted the end of the index finger. While the patient was under the influence of ether and in the semi-prone position, I tore the stricture posteriorly with the index finger of the right hand hooked into it. With two fingers of each hand I ruptured the sphincter ani muscle, and at the same time the indurated tissue of the rectal wall just above the sphincter. I then felt a fibrous band running somewhat obliquely across the posterior part of the upper stricture. I cut this band with a small knife which was concealed within, and could be projected at will from, a flattened sheath. The whole stricture immediately yielded, and by means of Sims's speculum, nearly the whole of the lower part of the rectum was plainly brought into view. The cut was made on the median line and posteriorly. There was not a teaspoonful of blood lost during the operation. The danger in this case was from peritonitis and from septicæmia. The first I believed could be controlled by the appropriate use of morphia; the second could be prevented by washing out the rectum several times a day with carbolized injections. During the first twenty-four hours she was inefficiently nursed, and took the morphia very irregularly. She was allowed several times to sit up and strain at stool for one or two hours at a time, after which she was very much exhausted. When I saw her the next day, I urged the parents not to allow her to sit up, but to have a bedpan put under her when required, and to procure immediately, if possible, an experienced nurse. During the second night after the division of the stricture she had an alarming collapse, and vomited once. She was resuscitated by the application of hot bricks to her feet and by teaspoonful doses of brandy and water. I remained at the house with her during the night and part of the following day.

On the 14th of July a good nurse was obtained, and the pulse, which had been at 140, under the influence of a solution of sulphate of morphia regularly given fell to 120, and the patient's condition was better. There was not so much tenderness about the lower part of the abdomen. The mother persisted occasionally in giving the patient her medicine, and instead of a teaspoonful of a solution of morphia which contained the one-eighth of a grain of this substance, gave by mistake a teaspoonful of a saturated solution of carbolic acid. This was used largely diluted with water to wash out the rectum. Dr. Crandell was in the room at the time that this mistake occurred, and Dr. Worthington and myself were in the adjoining room. The whole interior of her mouth was blanched, and she experienced very great distress in swallowing some milk which I requested her to drink immediately. After a few hours the pulse ran very high, and the distressed feeling about her mouth and throat increased, and she died about twelve hours after the swallowing of the carbolic acid, which contained only five per centum of water. I regarded this case as a very unfavourable one, and which possibly under different circumstances I should have declined to operate upon. But it was quite evident that her only chance to obtain any relief was in a careful division of the stricture or by its rupture in the manner in which I effected it, to be followed by methodical dilatation with the rubber bag distended with water. She had commenced under better nursing rapidly to improve, and would I believe have recovered had she not swallowed the carbolic acid.

CASE III.—The following case is interesting from the fact that several attempts were made to disperse, by electrolysis, the interstitial deposit which formed an indurated mass that caused the stricture of the rectum.

Mrs. K. consulted me at my clinic at the Northwestern Dispensary more than eighteen months ago, for stricture of the rectum. The stricture admitted with difficulty the end of the finger, and extended from opposite the Douglas cul-de-sac, upward above it, and beyond the reach of the finger. The stricture was unmistakably the result of syphilitic ulceration of the rectum, and the patient had a secondary eruption on the skin. This eruption, under appropriate treatment, disappeared, but reappeared once or twice, and she, at present, has an ulceration of the leg of syphilitic appearance. Soon after I first saw her, she was etherized, and the stricture was cut with a curved bistoury anteriorly, and posteriorly at its lower part; but as I could not reach the upper part of the stricture with my finger, the operation was necessarily incomplete. The knife was securely wrapped, except near its point, with cotton, and the cutting part was well protected by the end of the index finger of the right hand. Attempts were irregularly made to dilate the stricture with the rubber bags, and by forcible dilatation with the finger. I held in reserve, however, this case for another cutting operation, and decided that I could safely make a very extensive incision, if required, on the posterior wall of the rectum. My opinion in this matter was strengthened by a careful examination of two or three cadavers with reference to the relations of the peritoneum to the rectum. Besides, Professor Darling, of this city, professor of anatomy in the University Medical College, kindly called my attention to a dried specimen which well illustrated these relations in a manner usually overlooked by anatomists. An incision made posteriorly, at any point along the median line, from just below the promontory of the sacrum, and between the folds of the meso rectum to the sphincter ani, will not wound the peritoneum, or be likely to be followed by hemorrhage. But the peritoneum covers the sides of the rectum quite low down, and the peritoneal duplicature of the utero-sacral ligaments in relation also, anteriorly with the rectum, may, especially in partial prolapsus of the uterus, draw the peritoneum unusually low down on the sides of the rectum.

I was attracted to the use of electrolysis in the treatment of strictures of the urethra by Tripier's article in the *Arch. Gén. de Médecine*,[1] and besides, I was invited by Dr. Robt. Neuman, of this city, to see with him a patient with stricture of the rectum, and to which he made one application of electricity with Stöhrer's battery of sixteen elements, and subsequently used my dilator for elastic pressure. I am not quite sure which electrode Dr. Neuman applied to the stricture. As an immediate result of this application the stricture was considerably dilated. Quite recently, a post-mortem examination of the case afforded Dr. Neuman an opportunity to exhibit to the New York Pathological Society the rectum of this patient. It seems that, having obtained some relief, she became careless and neglected herself; finally she got worse, and had fecal fistulæ to form. The specimen shown to the Society interested me exceedingly, but I was unable to draw any definite conclusions from the appearance of this specimen, as to the value of electrolysis in the treatment of strictures of the rectum. However, I had, after having seen Dr. Neuman's case, obtained Dr. Wm. B. Neftel's co-operation in the electrolytic treatment of the stricture of Mrs. K., the subject of the third case, and which I am now reporting. The electrolytic treatment of this case extended over a period of one month, and during this time four applications of electricity were made. All other kinds of treatment were purposely avoided, so that the electrolytic action might be well tested. The patient was not etherized, and the first application was made with a new galvanic battery of Curt Mayer, of New York (a platina zinc battery). A cathode made for the purpose, consisting of hard rubber and a solid brass cylinder rounded at the end, was introduced by me partially into the stricture. Dr. Neftel commenced with one element, and increased gradually, one by one, to twenty elements. There was a slight and gradual increase of pain. A current of twenty elements was maintained for fifteen minutes. I repeatedly examined the part during this time. The applications lasted about half an hour. There was an immediate dilatation of the lower part of the stricture only.

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[1] La Galvano-caustique Chimique, par le Doct. A. Tripier, Arch. Gén. de Méd. 1866, vol. i. p. 18.

On the 16th of January, 1872, a week after the first application, another one was made with Remak's battery. Dr. Neftel thought that it would be well to isolate with shell-lac, or hard rubber, the rounded end of the brass cathode. It was isolated at its end with shell-lac, and introduced by me into the stricture. The anode, in the shape of a flat disk, and separated from the skin by a piece of wet cloth, was, as in the preceding application, applied to the hip, and shifted about from place to place, when the heat developed at the anode, or positive pole, became unendurable. The application began with two or three elements, and was gradually increased to fifteen, at which number the current was maintained for five minutes, with a deflection of the needle of the galvanoscope of fifteen degrees. The current was then gradually, by the addition of one element at the time, increased to twenty-one elements, as denoted by the position of the winch in the current-selector. A current of twenty-one elements was used during five minutes; it was then interrupted, and I examined with my finger, and found that the upper part of the stricture was considerably dilated. The circuit was again closed, and the cathode reapplied to the central part of the stricture. The applications this time lasted altogether fifteen minutes, and the patient afterward did not feel uncomfortable. Possibly it may be well to observe that Dr. Neftel used the elements of Siemens, which were substituted for Remak's elements, and were contained in the box of Remak's apparatus. It appears to me that, for accuracy of observation, it would be desirable to adhere to the use of one apparatus.

January 24, a third application was made. Previously the patient stated that her bowels were more easily moved, and an examination revealed that the stricture was more dilated. A brass cathode, isolated at its end with hard rubber, was introduced into the stricture, and the anode applied to the external part of the thigh. Twenty-three elements of Siemens were used during twelve minutes, with a deflection of twenty-three degrees of the needle of the galvanoscope. Twenty-one elements were used for eight minutes longer. A considerable quantity of frothy mucus, caused by the evolution of hydrogen at the cathode, issued from the rectum. The applications this time lasted altogether twenty minutes. After the discontinuance of the current I found that the upper part of the stricture was much dilated, but that the middle part was still constricted. A week later, another application of electricity was made much in the same manner as this one, but of which I failed to keep any notes. I decided not to use dilatation after these applications, but to permit a few months to elapse before I examined her. I believe this was also Dr. Neftel's suggestion.

April 16, 1872, she came to the Northwestern Dispensary, and was carefully examined by my clinical assistant, Dr. A. Landeta. The stricture with difficulty admitted the end of the index finger, and was quite as tight as before the electrolytic treatment.

Possibly it may not be out of place, in connection with this case, to attempt to define what is meant by electrolysis as applicable to the dispersion of certain tumours, or of the induration of the tissues, as in stricture. The different effects of the two electrodes on the living tissues should be distinguished one from the other. These effects are modified by the use of batteries of great electro-motor power, or of feeble power, or composed of many small elements, but of great tension. It seems to me that a multitude of different circumstances influence the effects of the currents. The kind of electrode used; such as needles, blunt or flat electrodes, and these last with or without moisture, modify the effect. The moving of the electrodes, and, if needles be used, the position in which they are stuck into the flesh, whether parallel or in a line continuous with each other, are also worthy of attention. The effects must necessarily differ widely, because, if, as in the last case, the needles intersect, or are continuous with each other, especially should their points be near together, we may have a bad slough of the tissues in the place of a resolutive or electrolytic action, such as is supposed to occur at the cathode of a galvanic current, under conditions favourable to the development of the peculiar effects of the negative current at this pole. It is not at all my object to discuss the subject of electrolysis, but I, probably in common with many others, would like to know what is its practical value, and also something about the right indications for its use, and the proper manner to develop the electrolytic action.

It is necessary, it seems, to distinguish well the decomposing power of the current from its heat-producing power. The chemical and decomposing power, or electrolytic effect, is supposed to take place at the cathode, and is caustic in its action, but caustic after the manner of alkaline caustics. The heat-producing power of the current is developed at the anode, at which may be produced a disorganization of the tissues immediately around it, similar to that caused by the actual cautery. If the anode be a thickly plated gilt needle, thrust into the tissues, it will be corroded by oxidation, and there may be considerable difficulty in withdrawing it. The disorganization of the tissues immediately around the needle will be proportional to the greater or less intensity of the current. If the cathode, or negative electrode, be also a needle, and thrust into the flesh, no corrosion of this needle occurs, but soon the tissues around it will become emphysematous by the escape of hydrogen. An alkali is evolved at this electrode, and an acid at the other. It would seem that there occurs a mechanical disassociation of the tissues by the action of the escaping hydrogen, and a dissolving and fluidifying effect caused by the alkali liberated at the cathode. If the anode be a plate or disk, the heat may be so great as to burn the patient severely. It should be recollected that the positive electrode is at the end of the wire which leads from the negative metal, and the negative electrode at the end of the wire which leads from the positive metal, and which would be the zinc, if this be used, in a zinc and copper battery.

The direction of the positive current is from the metal oxydized to that which is not, and the direction of the negative current is the opposite. Tripier's experiments on strictures of the urethra gave immediate results which were seemingly satisfactory. The strictures in each case after the application of the cathode were enlarged, but their condition a few months afterward is not stated. He concludes that the negative galvano-cauterization, or that obtained with the cathode, is an excellent substitute in certain cases, for the caustic of Filhos, and that the cauterization obtained with the anode may replace that of the strong acids, or the actual cautery. He claims that the cicatricial tissue which results from cauterization with the cathode is soft, thin, and not resilient, and that the inodular tissue produced at the anode has the usual character of such tissue. The greater the electro-motor force of the battery, the more rapid, and the more painful will be the cauterization. Whichever electrode is selected for cauterization, the effect would be, apparently, to burn a larger hole through the stricture, and it seems to me that dilatation should be used afterward in order to obtain any benefit from this mode of treatment.

CASE IV.—As an example of stricture of the anus and lower part of the rectum, caused by the injudicious application of caustics for the cure of hemorrhoids, the following case may prove interesting.

Through the recommendation of Dr. Horace P. Farnham, of this city, a gentleman from one of the Western States recently consulted me for an intolerable itching about the anus, and for great difficulty in evacuating his bowels. There were hard and slightly elevated folds of the integument immediately around the anus, and on introducing the finger into the rectum, the tissues about the anus felt very much indurated, and formed a tight stricture at the anal orifice. On remarking to him that probably some caustic application had been made to the parts, he replied that a few years ago he was treated for hemorrhoids by several applications of caustic, and that he had since noticed a gradually increasing difficulty in relieving his bowels. I told him that gradual dilatation was, in his case, the only safe and effectual means of relieving him, that division of the sphincter ani, at present at least, was unnecessary, and that dilatation would also afford him relief of the itching. I advised him to have a number of smooth and slightly conical plugs, about two inches long, made of maple wood, each with a handle, and also with a flange, to prevent it from slipping too far into the rectum. These plugs should be graduated in size, from that of the finger to that of the largest bougie.

ART. VII.—*Fibrous Tumour of the Base of the Tongue.* By J. F. FITTS, M.D., of Francestown, N. H.

DR. J. H. POOLEY, of Yonkers, N. Y., reported in the April, 1872, number of this Journal (p. 386) a case very similar to one which came under my own observation, and such cases being rare, I offer the following report of it. Dr. Pooley speaks of the tumour in his case as unique, especially as regards situation—the tumour in my case was in this respect precisely similar.

Miss H., aged 30, sent for me about the first of May, 1869, for some slight affection of the throat, the result of a sudden cold. In examining the throat while depressing the tongue, I noticed a tumour rising up at its base, of about the size of a filbert. The patient was entirely unaware of its existence, and it might have remained there unnoticed for months but for this chance examination. There had been no pain, soreness, dysphagia, dyspnœa, or hemorrhage to call attention to any lesion of the throat or tongue. In fact, she had never had any trouble with her throat, except such as resulted from taking cold. The tumour was situated exactly in the median line, on the base of the tongue, and so far back that it was somewhat difficult to pass the finger behind it. It was exceedingly hard, incompressible and immovable. It was sessile, or at least, if there was any pedicle, it was so broad that it was not easily made out. Examination caused some pain but not at all severe. The case was under my care until the following November, when by my advice she went to the Massachusetts General Hospital for a thorough laryngoscopic examination, and operation if deemed advisable. In the mean time, the tumour had steadily increased in size, until on opening the mouth and protruding the tongue, and without using any depressor, it filled almost the whole of the fauces. It had caused but very little trouble, perhaps no more than might have been produced if the imagination were only worked upon.

I accompanied her to Boston, but as she could not then be admitted into the hospital, we returned home without anything being done, save a superficial examination by the resident physician and one surgeon, but no opinion was advanced. Subsequently, in January, 1870, she returned to the hospital, was examined and operated on by Prof. Bigelow. The tumour was removed *en masse*, with the écraseur, the patient being under the influence of ether. At the time of its removal, the tumour was the size of a pigeon's egg.

I was not present at the operation, but I learned that there was no alarming hemorrhage, and the patient made a good recovery; was at home in the course of three or four weeks, and able to attend to household duties.